

We Claim:

- 1) A process for delivering a polynucleotide into an extravascular parenchymal cell of a mammal, comprising:
 - a) inserting the polynucleotide into a mammalian blood vessel, in vivo;
 - b) increasing the permeability of the blood vessel;
 - c) passing the polynucleotide through the blood vessel into the extravascular space;
 - d) delivering the polynucleotide into the mammalian extravascular parenchymal cell; and,
 - e) expressing the polynucleotide.
- 2) The process of claim 1 wherein increasing the permeability of the blood vessel consists of increasing pressure against blood vessel walls.
- 3) The process of claim 2 wherein increasing the pressure consists of increasing a volume of fluid within the blood vessel.
- 4) The process of claim 3 wherein increasing the volume consists of inserting a solution containing the polynucleotide into the blood vessel.
- 5) The process of claim 4 wherein increased pressure is controlled by altering the volume of the solution in relation to the time period of insertion.
- 6) The process of claim 5 wherein the blood vessel consists of a tail vein.
- 7) The process of claim 1 wherein the cell is selected from the group consisting of a liver cell, spleen cell, heart cell, kidney cell, prostate cell, skin cell, testis cell, skeletal muscle cell, fat cell, bladder cell, brain cell, pancreas cell, thymus cell, and lung cell.

- 8) A process for delivering a polynucleotide complexed with a compound into an extravascular parenchymal cell of a mammal, comprising:
- a) making a polynucleotide-compound complex wherein the zeta potential of the complex is less negative than the polynucleotide alone;
 - b) adding another compound to the complex to increase zeta potential negativity of the complex from the previous step;
 - c) inserting the complex into a mammalian blood vessel;
 - d) increasing the permeability of the blood vessel; wherein the polynucleotide passes through the blood vessel wall;
 - e) delivering the polynucleotide into the mammalian extravascular parenchymal cell; and,
 - f) expressing the polynucleotide.
- 9) The process of claim 8 wherein increasing the permeability of the blood vessel consists of increasing pressure against blood vessel walls.
- 10) The process of claim 9 wherein increasing the pressure consists of increasing a volume of fluid within the blood vessel.
- 11) The process of claim 10 wherein increasing the volume consists of inserting a solution containing the polynucleotide into the blood vessel.
- 12) The process of claim 11 wherein a specific volume of the solution is inserted within a specific time period.
- 13) The process of claim 12 wherein increased pressure is controlled by altering the volume of the solution in relation to the time period of insertion.
- 14) The process of claim 13 wherein the blood vessel consists of a tail vein.
- 15) The process of claim 8 wherein the cell is selected from the group consisting of a liver cell, spleen cell, heart cell, kidney cell, prostate cell, skin cell, testis cell,

skeletal muscle cell, fat cell, bladder cell, brain cell, pancreas cell, thymus cell, and lung cell.

- 16) The process of claims 1 and 8 wherein the polynucleotide is inserted in at least a 1 milliliter solution.
- 17) The process of claims 1 and 8 wherein the extravascular parenchymal space consists of the hepatocytes.
- 18) The process of claim 17 wherein intrahepatic parenchymal pressure is at least 10 mm mercury.
- 19) A kit for testing *in vivo* gene expression in individual organs, comprising a receptacle containing a DNA linked to a promoter for *in vivo* expression screening.
- 20) A kit for testing *in vivo* gene expression in individual organs, comprising a receptacle containing a DNA linked to an enhancer for *in vivo* expression screening.